for most parents to keep their offspring out of school. Thus, it is probable that the picture of average health obtained from the limited number of children available for examination would not have been essentially modified by including the children absent from school.

Had the great number of children who were away in the cotton fields been included in the results, the figures for common cold, bronchitis, and skin infections like impetigo would probably have risen, for it is known that such disorders are favored by the living conditions in these places. But, as with school attendance, absence for work in the fields has little connection with general health.

No epidemics of childhood diseases were reported during the period of the health survey, but, without question, single cases of acute illness in absentees escaped attention.

One hundred and thirteen children (58 boys and 55 girls) were thus examined. Of these, 73 lived in the eastern area, and 40 in the western. Table 2 illustrates the principal results obtained from the whole Papago group.

One impressive finding of the health examinations was the exceedingly small number of children in perfect health. Further, almost half the children (43.4 per cent) appeared underfed—were thin or emaciated. About the same percentage showed signs of malnutrition (i.e., vitamin deficiencies, etc). This figure is lower than it might have been if, with the aid of X-ray examinations, less manifest bone malformations caused by rickets had become evident. The great number of children with marked irregularity of the teeth leads to the suspicion that vitamin D deficiency may affect a greater number of children than those who displayed obvious signs of rickets in ribs and long bones (the only indications of vitamin D deficiency used in this study).

The next most common abnormality found was enlargement of tonsils. If to this figure are added those cases in which tonsils had been removed, the percentage of children who were suffering or once had suffered from chronically diseased tonsils rises from 41.6 to 59.3 per cent.

Over a third of the children showed symptoms of an acute cold, such as coryza, sore throat, and signs of bronchitis. This is rather a high figure but not surprising if it is remembered that the examinations took place from December to February, when nights are cold even in southern Arizona. In the mornings the children often climbed stiff and shivering from the school bus and rushed into the school to crowd around the stoves. Only rarely did they wear sweaters or coats; most of the boys wore the same denim overalls and thin cotton shirts as in the hottest summer months, and the girls had on light cotton prints over rayon panties and (occasionally) a slip.

The incidence of other disorders does not seem remarkable. The children's teeth were bad, no doubt, but such findings referred mostly to milk teeth, while only a relatively small percentage of older children showed dental decay. 164

However, certain chronic diseases were apparent which, because they are contagious, would constitute a grave danger for any community, even though

TABLE 2

FINDINGS OF MEDICAL EXAMINATIONS
(In Percentages of Total Number Examined)

Condition	Total Group	Eastern Children	Western Children
Good health*	7.1	8.2	5.0
Good nutrition	56.6	49.3	70.0
Fair nutrition	25.7	34.2	10.0
Poor nutrition	17.7	16.4	20.0
Malnutrition†	44.2	50.7	32.5
Impaired vision	6.2	8.2	2.5
Active trachoma	17.7	17.8	17.5
Arrested trachoma	16.8	19.2	12.5
Irregular teeth	51.3	54.9	45.0
Caries	33.6	39.7	22.5
Enlarged tonsils	41.6	35.6	52.5
Removed tonsils	17.7	27.4	
Swollen lymph glands	23.9	21.9	27.5
Suspected tuberculosis (lungs)‡	9.7	8.2	12.5
Valvular heart disease	2.6	2.7	2.5
Impetigo and ringworm	7.1	6.8	7.5
Colds§	35.4	30.1	45.0
Children examined (no.)	113	73	40

[146]

* No impairment except occasional irregularity of teeth.

† Evidence of marked vitamin deficiency, such as rickets, bleeding or ulcerated gums, fissure at corners of mouth (see p. 178 for discussion of nutritional states).

‡ As suggested by auscultation and percussion.

§ Acute colds with such symptoms as coryza, sore throat, or bronchitis.

the incidence were comparatively low. In Papago communities water is scarce or can be obtained only with difficulty, and frequent washing of hands, body, and kitchen utensils is a luxury. Particularly in wintertime, most persons sleep close together in one room, usually in the same clothes worn during the day. In such communities the significance and danger of communicable diseases is commensurately heightened. [515]

For a number of years tuberculosis has been recognized as threatening the very survival of the Indian population of the United States. Among the Papago children studied, almost 10 per cent were suspected of tuberculosis of the lungs. If these suspicions were verified by means of longer observation,

4: Joseph et al D, E-5 (1942-1943) 1949
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164 X-ray examinations, and laboratory tests, they would certainly be cause for alarm. Though the incidence of tuberculosis among Papago children is unknown, in view of the number of adult Papago who fill the sanatoriums of Tucson and Phoenix (and who are recruited only from the few who submit to white medical treatment) even the rate of 10 cases per 100 children may be conservative.[1]

Another disease usually considered a curse of the Indian is trachoma, a contagious disease of the eyes which may lead to impairment of vision and, occasionally, even to blindness. Many Papago old people are afflicted, but since the discovery of treatment by sulfa drugs, which can easily be administered at school, the incidence of trachoma has dropped steeply among school-age children all over the Reservation. Thus only 17.7 per cent of the Papago children studied were suffering from active trachoma, while about the same percentage showed the disease in an arrested state.

There are other Indian tribes, like the Hopi, among which this disease has been much more nearly eradicated. The Papago, who leave the Reservation in great numbers to work for several months each year in the cotton fields where organized health service is lacking, are much more exposed to reinfection than those tribes which, firmly settled, stay a lifetime in their reservation villages.

Impetigo, a staphylococcus infection of the skin, was until a few years ago a widespread disease among Papago children. The writer recalls that even in 1941 on field trips and in the clinic of the hospital at Sells she saw a large number of children literally covered with impetigo sores. Owing to the very active campaign against impetigo undertaken by the health and school authorities of the Reservation and to the co-operation of all day-school teachers in its treatment, it is now rarely found among children of school age, though every year the return of a large number of children from the cotton fields results in a new outbreak. Among the children examined in this survey who had remained at home or who were in boarding school, only 7.1 per cent had impetigo. In all cases the disease was limited to one or a few sores. Though even a rate of 7.1 per cent may appear high, it constitutes a tremendous improvement over previous conditions.

164 157 These are the essential findings of the physical examinations used in the survey. Before reviewing them, it may be of interest to note that none of the children volunteered complaints about their health. Nor did they come forward, when asked, with tales of headaches, upset stomach, or previous diseases. All of them said point-blank that they were and always had been perfectly healthy. Recalling the attitude of the average adult Papago at the Sells hos-

1. The high rate of death from tuberculosis among the Papago as a whole is noted in chap. vii.

4: Joseph et al D, E-5 (1942-1943) 1949
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pital—quiet, dignified, and uncomplaining even when in acute pain—and remembering his reluctance to give information about his illness, the writer feels that the children responded according to the same pattern. That this attitude is not identical with a lack of concern about health we shall see later when discussing the results of the psychological tests.

When a California faith healer visited the Papago Reservation in 1941, large crowds from all sections came to see her and to be cured by her, in spite of the opposition of the Catholic church. Like Papago medicine men, who do not ask questions but by magic means acquire knowledge about the cause and course of an illness, this woman did not ask for information; the Papagos apparently thought she already knew the history of their illnesses through an inherent supernatural power. Here we get an inkling of the deep-seated difference between Papago reactions and attitudes and those usually found within the area of white culture.

We also see how our knowledge about these people would fall short if we relied only upon direct information. According to such information, all the children who were examined never had been sick or, at least, never had felt sick, though a number of them were known to have been treated by white physicians for various ailments. Therefore, if we wanted to establish, beyond the crude findings of the physical examinations, how far these children are in fact resistant to physical hardships and exposure, we should have to resort to statistical data furnished by the health service and based upon medical observation over a long period. At present this is not possible, since a relatively small part of the Papago population asks for white medical attention. The writer can only say that, during her stay on the Reservation as a field physician, the reported and observed number of school children with acute respiratory disorders and the seasonal incidence of the various childhood diseases impressed her as rather high.

The actual findings about the health of Papago school children are not too encouraging; they are far from the ideal standards of physical health postulated by modern science. Disregarding the tuberculosis suspects, no chronic debilitating diseases were prevalent. But the fact that almost half the children were more or less undernourished and about the same number showed signs of vitamin deficiencies seems ground enough for concern, particularly if we also take into consideration the physical hardships and exposures to which these children normally have to submit. That we cannot count upon an automatic increase of resistance in response to this constant exposure is evident from the high incidence of acute respiratory diseases in Papago children, especially in winter, and from the ravages of contagious childhood diseases like

4: Joseph et al D, E-5 (1942-1943) 1949
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164 measles and whooping cough, which frequently end in pneumonia. We may assume that what has been established experimentally for human beings and animals in general applies to Papago children: namely, that undernourishment tends to increase susceptibility to infections and that vitamin deficiencies may favor or produce inflammatory or degenerative conditions in mucous membranes, skin, and nerves.

146 The average Papago diet is extremely monotonous and limited in its main components (see chap. iv). This statement, based upon occasional observations and general impressions, is substantiated by the results of a study of Papago food habits made in 1942 by the United States Bureau of Indian Affairs and the University of Chicago. The three villages in which food habits were analyzed were not included in the present research; but they are communities embracing three levels of typical economic status and acculturation, so that the applicability of the findings to the whole Reservation seems reasonably certain.

In the course of the diet study, the investigator (Emma Reh) listed sixteen foods used during an average week in the meals of a poor Papago family and twenty-seven items found in those of a rich family.[2] Several varieties of beans, wheat flour, corn, coffee, and sugar, with the occasional addition of meat in the prosperous family, constituted the bulk of the food. An analysis of the nutritional value of the average Papago diet (made by Michel Pijoan, M.D. on the basis of Miss Reh's findings) revealed that the average amount of calories ingested was sufficient but that there was a moderate insufficiency of calcium and a marked insufficiency in vitamins A and (particularly) C. Furthermore, only 21 per cent of the protein consumed was derived from animal sources, suggesting deficiency of some of the most valuable types of proteins.

Part of these findings were corroborated in 1943, when, independently of the above-mentioned research, examination of twenty-eight Papago school children revealed a pronounced insufficiency of ascorbic acid (vitamin C) in their diet. It was stated that "in some cases . . . certain stigmata of early scurvy can be found, such as bleeding gums, hemorrhagic diatheses about the ankles and heels, and loose teeth."[3]

All these findings suggest that Papago diet, which is largely dependent upon the limited agricultural resources of the desert and upon cultural traditions,

2. See Emma Reh, "An Economic Study of the Papago Indian Reservation, Arizona."

3. Michel Pijoan, C. A. Elkin, and C. O. Eslinger, "Ascorbic Acid Deficiency among Papago Indians," *Journal of Nutrition*, XXV (1943), 444.

4: Joseph et al D,E-5 (1942-1943) 1949
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was pregnant with the youngest child. It was impossible to obtain any information about his father's character or about the circumstances of his death. 159

Jack's mother is a neat, friendly woman. As a young girl she attended a boarding school off the Reservation, but she seems to have forgotten most of her English. As the great-grandmother and grandmother are dead and the paternal aunt is unmarried and hampered by a physical defect, the mother is the female head of the house, which she cares for with the help of her small daughters.

At the age of six, Jack started going to the Catholic mission school and has been attending faithfully since. He is absent only when badly needed in the fields or on the ranch, and he always tries to make up the work missed. He likes arithmetic, is good at any type of manual work, and makes excellent pencil drawings. This boy has never been a disciplinary problem and needs little supervision. Although he always has been larger than his age mates, he seems to associate with them in a natural way, maintaining himself with dignity and without becoming the target of ridicule.

Recently Jack has spent most of his free time in his grandfather's company. With his sisters and his small brother he apparently gets along well; though he does not pay much attention to them, he is kind and has never been observed quarreling or teasing. Not openly interested in girls, at fiestas he stands quietly by, watching the dancers without dancing himself. His general behavior toward white people is quiet, unobtrusive, and shy.

Jack is quite handsome and well proportioned, but his size and development put him physically in the class of Papago young men of twenty. As excessive obesity is common in this family, it is quite possible that Jack has an endocrine disturbance. His eyes, somewhat inflamed, show signs of arrested trachoma, and his tonsils are enlarged; otherwise he is a strong and healthy boy. [143] [164]

The Grace Arthur test, in which he scored an I.Q. of 144 (the highest of all Papago children tested), determined his intelligence as superior. Independently, the results of the two projective tests led to much the same conclusion, indicating also ability to form clear concepts and a gift for detailed and subtle observation. These tests also agree in pointing out the caution with which he approaches problems—a caution which contributes to the solidity of his concepts but also limits the free expression of his imagination and his power of organization. They further establish a most surprising contradiction to the boy's outer appearance: a remarkable sensitivity and a highly developed feeling for people and interpersonal relations. However, he has a deep reluctance to yield to his essentially delicate and sensitive nature, as if he considers it improper. Obviously this results in insecurity and shyness. Highly socialized

7: Lumholtz N-5 (1909-1910)1912
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159 In 1849: Unusual snowfall, killing men and beasts.

173 In 1850: Successful attacks by the Apaches on the Maricopa at [721] Red Rock, as well as on the Papago near Magdalena, Sonora.

In 1851: Severe disease, called "black vomit," appeared. Its symptoms were painful fits and cramps. Dark-colored blood would flow from the mouth. When the sufferer vomited, it was a sign of relief. Many Indians died, including some medicine-men. (This may have been yellow fever.)

[721] In 1852 and 1853: Papagoes repelled attacks by the Apaches in Arizona.

In 1854: Papagoes fought with the Apaches at Santa Ana, Sonora.

In 1855 and 1856: Death of relatives.

In 1857: American soldiers were killed by Mexicans at Caborca. (This alludes to the defeat of the filibusters under Captain Crabbe.)

In 1858: Birth of a girl relative. She afterward became makai (medicine-man.)

[585] In 1859: The Papagoes in the winter went to dance with the Pimas, below Sacaton, in order to secure wheat. (It was also the custom for the Pima to help at the feasts of the Papago, the reward being in either case grain or domestic animals.)

In 1860: Prominent chief died.

In 1861: Papagoes in Mexico engaged the Apaches and were victorious. [721] The booty, consisting of shields, bows, and arrows, was sold to the Mexicans for mescal brandy and maize.

In 1862: A fight with the Apaches in Mexico.

In 1863: His first marriage took place.

In 1864: His first child was born.

In 1865: Apaches captured one Papago, who later escaped.

In 1871: Apaches made peace with the whites at Arivaipa.

In 1874: Apaches attacked San Xavier.

In 1875: Ball games with foot-racing at Caborca, Sonora. He won in betting, one horse, saddle, and bridle.

[164] In 1876: Disease, accompanied by the loss of hair. Many died. (Perhaps this was typhoid fever.)

In 1880: The railroad arrived at Tucson.

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In 1881: A relative became crazy, killed his wife with a knife, and then himself. 159 173

In 1882: First *fiesta* in Mexican fashion took place at a rancheria which formerly existed where at present the Indian Oasis is. (This means that the Indians of Arizona began to adopt the social gathering in use among the Mexicans, without imparting any religious importance to the festival. A fiesta among Mexicans always includes dancing, which, in our time, has been adopted by the Papagoes of Sonora, but generally not in Arizona. On the occasion related, the people danced one by one in a circle.)

In 1885: A visit to a Pima feast. Many singers went, and many others, all well dressed. [527]

In 1887: An earthquake in the "flowers disappear" moon. [133]

In 1889: The Pima took part in a dance in order to secure cattle. This was in the "dry grass" moon.

In 1890: A feast at San Xavier in the "dry grass moon."

In 1891: San Xavier Indians came to dance at Kvitatk (near the "Pump-house" near Horseshoe).

In 1893: A foot-race at Kvitatk in "inner bone" moon (winter). The racers starting in the middle of the day, ran as far as Santa Rosa, returning at dark (about 8 P.M.). [526]

In 1897: Foot-races at Áktjin.

In 1898: Two nephews put in prison in Yuma for smuggling mescal brandy.

In 1899: Two relatives imprisoned in Tucson for stealing cattle.

In 1901: He was isolated at Tucson on account of small-pox in the family. [164]

In 1902: A foot-race at Tjeavólitak.

In 1903: A foot-race at Kvítatk.

In 1904: The purification of girls in the winter. [783]

In 1907: His friends put in jail for fighting at a sahuaro feast at Kvítatk.

In 1908: Many Papagoes that were attending the fiesta of San Francisco in Magdalena, Sonora, were imprisoned for resisting the Mexican authorities when being pressed into military service to fight the Yaqui. A chief from San Xavier went down to Magdalena and helped them to get out.

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sine of barbarous Indians is excellent. To be sure, they 252
have few dishes, but there is variety enough, and an important fact is that the food is never "killed," *i. e.*, overcooked, as is the all too common habit of the poor white man; the food retains a natural, pronounced flavor of its own, unknown to most whites, besides having all the life-giving elements. After all, nothing tastes as well as the simple things, well cooked. What is better than the whole wheat cakes of the Papago Indians of Sonora? They are nature's genuine gift to hungry men, furnishing at the same time extreme satisfaction to one's sense of taste. I know of an American who came across this dish fit for kings in a corner of Sonora, to whom it was such a revelation that he ordered two sacks of the flour to be sent to his distant home. The primitive Indian way of cooking beans in clay vessels without lard is unsurpassed for preserving the inherent flavor of the bean. No one can cook squash as my modest Indian hostess or make an *atole blanco* (thin gruel of maize) like hers; even the Mexican women cannot compete with her in this. The green corn that is offered in early autumn in fashionable restaurants in New York as a native delicacy ought to bring a blush of shame to the chef's cheeks, watery and devoid of flavor as it is.

Apart from the stultifying process of jumping literally, as the saying goes, from the frying-pan into the 252 146
fire in their effort to imitate the white man, there is a very sad feature connected with the abandonment of native dishes. Indigestion and a one-sided diet undermine the strong constitution of the Indian, enfeeble his [164]

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252 146 [164] blood, and leave him with little power of resistance to his great scourge, tuberculosis. According to my interpreter, who is an observant man, it is no uncommon occurrence among the Papagoes who have adopted the white's man's cooking, even to die from indigestion. Next to brandy, lard is the greatest curse civilized man has brought to the Indian.

000 After a warm and cloudy night we had the somewhat rare experience of four hours of rain in the forenoon. Still, in the afternoon, as the rain had not been so very heavy, we decided to return to Kukómalik, thinking we might get there in an hour and a half by driving a little fast. We made our way very well up to about a mile within our destination, when our horses began to encounter difficulties. The land here was slightly depressed and therefore retained the newly fallen rain as a reservoir on its alluvial soil. The ground became very soft, and finally, in spite of heroic efforts, our horses could pull no more. The night had overtaken us with darkness, deep as in Egypt of old. Pablo went to look for a team to pull us out, while I remained behind trying to light a candle which the insects aggressively put out. At ten o'clock the moon rose and made the outlook a little bit more cheerful.

A fresh team of Indian horses after a while came splashing through the water, but they proved inadequate for the task, and we had to camp where we were. The mud was of the kind of which adobe is made and stuck to our shoes like clay, but there was no necessity for walking around much. There were a few mezquite

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having had to be abandoned because a Papago woman during a rainy night had slept there. According to the notions of many primitive people, she was at the time unclean, and became the cause of the building of a new lodge. At the native cemetery many makai have been interred who on feast occasions are invited to take part with the living.

The old man's son had married a woman who was reputed to be a prophet—a female makai, with whom the principal men from Quitovac and other localities at times consulted. She looked about thirty years old and had been totally blind for three years. According to her own account, she had previous to her blindness suffered for a year from violent headache and pain in the eyes. I have seen Indians made blind through small-pox, their eyes covered in a similar way with large whitish spots over the iris. In the house of this couple were held the nightly meetings that usually took place at the new medicine lodge, as the latter had been temporarily profaned by the interference of an ox that had browsed and torn the straw of which its dome-shaped roof was composed.

I proposed to my Papago interpreter, Clemente, that we should attend that evening, as nothing worse could happen to us than to be told that our presence was not desired. A brisk fire was burning as we entered, making the interior look attractive though there was no outlet for the smoke except through the door. Several mats had been spread on the earthen floor around the fire for the participants to sit upon. Two were placed for Clemente and me, on which we immediately seated ourselves, thus

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Sand Papago

nicer disposition than Pedro, in an emergency I think I should rather trust myself to the brutal sagacity of the latter.

Judging from these two and from a third one, Agustin, that I knew, the sand people were not a pleasant lot to deal with. They were rapacious and probably merciless to strangers, whether Indians or Mexicans. Agustin was a distant, disagreeable kind of a man, whose confidence it would take years to win. According to Mexican accounts, the areneños formerly made the roads dangerous to pass, and nobody could follow them into the sand dunes to their principal retreat at Pinacate.

These Papagoes were called Híatit Óotam, "sand people." According to my companion, the medicine-man Pancho, who spent his early life in the dunes, they were not many in number and used to travel all together. He asserted that a peculiar disease accompanied by the vomiting of "yellow and green and then blood" killed most of those natives, and thought that it was brought from Yuma. The course of the disease took from four to ten days. It probably is the same affliction that is mentioned on the Papago calendar stick (page 74) as having occurred in 1851. The remaining four families decided to retire to other parts and for the last forty or fifty years the sand dune country has been uninhabited. These natives probably never exceeded in number one hundred and fifty all told, and their head-quarters were at *Hótunikat* (sunset), south of Pinacate. The great annual feast, now given at Quitovac, was removed from the Pinacate region before my informant's time—thus at least over

7: Lumholtz N-5 (1909-1910)1912
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may be seen playing harmoniously together, where a similar gathering of small Caucasians would soon result in discord, fights, and tears. The children and young girls have three kinds of chewing gum; the one which is most commonly used has been mentioned already, another is procured from the pod of a vine which comes early and dries in July; by squeezing the pod a milk is secured which when boiled yields a gummy substance. These natives never shake hands; they come and go and are never obtrusive. In the circumstances under which I travelled, I liked that custom; it made me feel independent and equally polite. When an Indian comes to shake hands with me, I know he has changed his mode of life, for one may be sure that he learned that custom from Americans or Mexicans. Their language is not sonorous, as it is full of guttural sounds and half-pronounced syllables. Four is their sacred number.

In the autumn of 1909 there was a mild epidemic of an eye disease among the Papagoes of Sonora as far west as La Nariz. The eyes were red and inflamed, as in conjunctivitis, and the pain evidently was very great. They probably contracted this disease from the Mexicans.

In his changed habits of life, inhabiting houses that do not admit air and adopting clothes that debilitate his magnificent physique, the Papago, when he catches cold, is unable to throw it off in the same way that a white man does. It very often develops into pneumonia and consumption, which awful disease is the scourge of the tribe, nine out of ten deaths being due to tuberculosis. The children bring it from school and even old people

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die from it, having acquired it through contagion. Although in no way a prison as to its restrictions, nevertheless the school as at present conducted does them harm physically. The confinement to which they have not been accustomed seems to undermine their health. In these days of advanced methods of teaching some remedy for this condition no doubt will be found. One absolutely necessary change is to alter the construction of the school-houses so as to make them sanitary through unlimited access of air. Even the Presbyterian Mission, which has been of considerable benefit to the Indian, has erected outside of Tucson incredibly inappropriate buildings, made of brick and substantial, to be sure, but singularly out of place in the glare and heat of the Arizona desert. Prof. R. H. Forbes, of Arizona University, told me that in the White Mountain Apache school, at White River, ninety per cent of the children have tuberculosis, chiefly glandular. This statement was made to him by the physician in charge. Would it not be better to leave the Indians uneducated than to proceed in this manner?

Not long ago the makai (medicine-men) had as many as five wives each, while the usual number for the ordinary man was two. At present it is very rare to find a Papago with more than one wife, and the average number of children in a family is usually no less than eight, but the mortality among infants is great. The position of woman is equality with man. To be sure, the man never carries burdens—that is relegated to the woman's domain—but she is the mistress of the house. She is,

8: Pijoan, Elkin & Eslinger D-5 (ca. 1942) 1943
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which involves the dietary intake and the level of ascorbic acid in blood plasma. The dietary intake of ascorbic acid found necessary to maintain a plasma level of this organic acid has varied with the techniques used by investigators. Widenbauer ('37) determined that a daily intake of 22 mg. was necessary to maintain a fixed plasma ascorbic acid concentration; Hathaway and Myer ('41) reported 31 mg., and Bessey and White ('42) in careful studies of children arrived at the conclusion that 3 ounces of orange juice plus what was present in the diet seemed an ideal intake to maintain a level of presumably 40–50 mg. a day. It can be assumed, on the basis of such investigations, that from 30–50 mg. are required to sustain ascorbic acid economy. It is not the purpose of this communication to ascertain the ascorbic acid requirements of Papago Indians but rather to ascertain the amount of ascorbic acid in their food and the plasma level. At the onset we were intrigued by the frequent occurrence among the Papagos of the common finding of a hemorrhagic diathesis in their gums, and in some cases on the ankles and other portions of the body that were most subject to trauma. We felt that the disease of latent or subclinical scurvy was a possibility among these people and that this deficiency might be responsible for its numerous insidious effects.

The method of assay for plasma ascorbic acid was that of Mindlin and Butler ('38) but without the use of cyanide; and that described by Bessey ('38) for foods. Two groups of children, from 6 to 15 years of age, were studied: a group at the Sells School where school lunches are provided, and a group in an isolated community known as Cowlic. School children were used because they were more acculturated and cooperative, the adults being quite primitive and to a greater degree intractable and less amenable to study.

The plasma ascorbic acid findings among twenty-eight children were as follows: one child had a value of 0.660 mg. per cent, which was the highest content observed; two had values of 0.528 mg. per cent, and the rest varied from the lowest ascorbic acid content of 0.264 mg. per cent to 0.396 mg. per cent.

8: Pijoan, Elkin & Eslinger D-5 (ca. 1942)1943
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146 In view of the fact that a plasma level of 0.8 to 1.0 mg. per cent appears to be the normal range for medical students (Pijoan and Klemperer, '37), the values expressed in the foregoing paragraph are low enough to indicate a continued shortage of this vitamin in the diet. Furthermore, the subjects studied were those in whom no wasting or progressive debilitating disease could be found. In short, it would appear that these subjects were good candidates for the study of vitamin C nutrition.

146 262 In the Papago village of Cowlic, the diet is low in ascorbic acid. It consists predominately of beans and home-made bread together with meat occasionally (possibly once a week, and used as a seasoning), and occasionally cooked pumpkins and cactus fruits.

146 No ascorbic acid was found in our assays of all of the various types of uncooked and cooked beans, corn, peas and dried cactus seeds. The only sources of ascorbic acid we are aware of in the Papago diet are as follows (in milligram per 100 gm.): Sahuaro cactus fruit 3.52; dried red chile 14.46; dried cactus buds (cholla) 1.48; spinach (pigweed) 3.72; wheat flour 2.7; and squash 2.75. Since most of these foods are consumed after they have been cooked, and since no "cooking time" (by boiling) was less than 20 minutes on the part of the natives, the same foods (2-gm. samples in 15 cc. water) were subjected to boiling (97°C., alt. 5600 feet) for 20 minutes. The ascorbic acid content in milligram per cent weight plus that in the water used for cooking was as follows: Sahuaro cactus fruit 1.76 mg., dried red chili 9.57 mg., dried cactus buds 1.16 mg., spinach (pigweed) 1.32 mg., wheat flour 1.5 mg., and squash 1.2 mg. Other foods consumed contained values as follows: bread 1.7 mg., and Sahuaro cactus fruit syrup 8.96 mg.

In a diet consisting essentially of cooked carbohydrate, where chili and other ascorbic acid-containing foods are only incidental, the ascorbic acid content never exceeds 15 mg. a day and is, generally speaking, on an average of about 5 mg. a day. Bleeding of the gums occurs in 70% of the Indians, and pyorrhoea is present in all the older adults examined.

● [164]

657 There are five welfare categories, Old Age Assistance, Aid to Dependent Children, Aid to the Blind (all administered by the state welfare office), Child Welfare and General Assistance (administered by the Bureau of Indian Affairs). In addition, everyone eligible for assistance in the above categories, plus those of minimum income, are eligible for surplus food under the Surplus Commodities Program (a state agency).

162 657 By 1962, according to Jones, the number of reservation welfare cases had jumped from 448 to 536, not counting an estimated fifteen children receiving Child Welfare benefits and 170 heads of households receiving surplus food. Counting dependents this means that more than 1800 residents out of a total of about 3000 on the three Papago reservations are receiving some assistance, directly or indirectly, from welfare programs.

162 657 178 [115] [586] [848] Welfare statistics pertaining to the Papago reservations are given in Table 27. Trends for fiscal years 1958 through 1962 indicate a gradual increase in Aid to Dependent Children cases. This has been noted also for the non-Indian population as a whole. An opinion with respect to the reason for this was provided by Pima County welfare officials: More women and children tend to return to the reservation, or remain there. More women are finding out about ADC grants. In addition, there is a national increase, as well as a local increase, in divorce. There is also an increase in illegitimacy. The primary cause for the condition that makes a woman and her children eligible for A.D.C., however, is the death, disability or desertion of the father. On the reservations death claims 25% of such cases, disability 22%, and desertion about 19% of the total.

[164] [165] [586] Given the nature of Papago family economy, the results of a comparison with the non-Indian population of Pima County are not particularly surprising.

162 171 657 For 1961 the non-Indian population of the county was estimated to be 48 times as large as the reservation Indian population. Using the population ratio of 1 to 48

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000 But there are farmers eager to hire illegal entrants. "They are my best pickers. They expect nothing and ask for nothing." Often wetbacks work, eat and sleep in the fields to avoid detection and deportation. Their presence further depresses wages and living conditions for legalled imported Mexican citizens and U. S. migrant workers like the Papagos.

SICKNESS

That sanitary conditions, or their lack, in southern Arizona labor camps constitute a clear and present danger to the health of their residents is proved by the concern growers and their wives living in the trading centers of the cotton growing area have finally shown in cleaning up the camps. Farmers themselves went to the point of organizing the Pinal County Health and Sanitation Committee.[1] This committee grew out of meetings with State Health Department officials in planning the health code later adopted.[2] It is cooperating with the State Health Department in making known provisions of the new code.[3]

Conditions in labor camps had to reach a low that was shocking to make trading town residents realize the threat to their own health diseased labor camp inhabitants comprised. Diptheria is ordinarily a comparatively rare disease in Arizona, yet late in November, 1950, the State Health Department had to rush a supply of serum to the Eloy area in Pinal county when 4 children were stricken in one camp.[4] The children felled by diptheria were Anglos, but the camp included 2 Papago families among its residents. One family had two boys in school--their father worked in the cotton fields so they might attend public school. The other family had two little girls, one about 2, the other less than a month old, sleeping trustfully in a fly-tight screened crib.

• 164 Earlier in the 1950 picking season, typhoid struck down a picker in the Casa Grande area. His death was not reported to the State Department of health; his family, with a child apparently already coming down with the disease, left for California.[5]

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[1] Coolidge Examiner, Dec. 8, 1950.
[2] Casa Grande Dispatch, Nov. 30, 1950.
[3] Casa Grande Dispatch, April 5, 1951.
[4] Arizona Daily Star, Nov. 30, 1950.
[5] Arizona Daily Star, Nov. 4, 1950.

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●164 At the end of the 1950 season when harvesters were gleaning the last bits of fiber from the fields, spinal meningitis killed a baby and his 4-year old sister and hospitalized 6 other residents of a labor camp in the Stanfield area. State Health Department officials charged filthy conditions in the camp were responsible,[1] and treated 50 camp inhabitants with sulfa drugs after posting officers to quarantine the camp.[2]

These are conditions threatening permanent residents of the cotton growing counties, and Papago and other migrant workers who live in labor camps. This is why a reservation town like Santa Rosa can be virtually prostrated by influenza at the end of the picking season when the Desert People return to their reserves.

752 Some ills Papagos fall heir to in camps are more or less special cases, like the woman whose foot was run over by a car in Magdalena. Once in a while some one is bitten by a spider. The Desert People are susceptible to colds and pregnancy, as one farmer put it. But one serious problem they share with many Southwestern Indians is a tendency to feed infants an unsuitable diet. In one labor camp 2 Papago babies died during the summer of 1950 from stomach disorders apparently resulting from eating green fruits in excess and other unsuited foods.

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75 177 The health problem of the Desert People is compounded by their reluctance to submit to European medical treatment. Papago attitudes toward European medicine vary a great deal, from educated individuals who rely on it to conservative families who have nothing to do with it. These most Papago of Papagos baffle farmers who trust in Western medicine implicitly and cannot fathom Papago reasons for not accepting it. One grower, himself of a minority group, could not understand how Papagos could "just lay there and die." But they can, and do, because they know nothing else. Their trust is in native medical practicioners. They do not turn to Western doctors because there have not been enough provided by the Indian Bureau to care for them, and the Papago medical staff has not effectively "sold" itself to the Desert People. All their training has taught the Desert People a system of disease and curing concepts totally different from those of the European doctor's.

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[1] Arizona Daily Star, Feb. 6, 1951.
[2] Tucson Daily Citizen, Feb. 6, 1951.

3: Whited G-5 (1890) 1894 NT15 River Yumans
Papago NU29

The Papagos are not addicted to
intoxicating drink, but smoking and gambling are so common among them that they will even stake their clothing on races, either by men or horses, and on the simple games with which they are familiar.

RELIGION.—The Papagos are nominally Catholics. Adults and children wear crosses and charms. They believe in witches and evil spirits, and buy charms to insure good luck.

At the little village of Ki-ki-wah, where there are a number of returned scholars, it was said that a simple service was held by these "graduates", in which they explained on Sundays the things they had learned about the white man's religion. At the village called Gunsight 2 Mormons have been living among the Indians for nearly 2 years.

EDUCATION.—The Papago youth of both sexes show considerable capacity for mental culture. Many of the Papagos speak Spanish fluently, even after having been at school for 2 or 3 years. When at home on their vacations they only hear Papago and Spanish, which tends to the disuse of what English they have acquired. They are docile, mild in disposition, and well inclined toward their teachers. They learn slowly but surely. The chief difficulty of receiving any permanent benefit from educating them is that they are so disastrously affected by the conditions which meet them when they return to their homes. They virtually return to barbarism and all old influences of a nonprogressive character.

The boys readily learn improved methods of agriculture, also the trades of tinsmith, blacksmith, and carpenter, while the girls learn sewing, cooking, and the general duties of housekeeping.

SCHOOL ATTENDANCE.—During the 3 years of the Tucson Presbyterian mission school 73 Papago children have been enrolled. There are 30 now on the rolls. The number enrolled at the San Xavier reservation schools is about 20. At Sacaton there are 15 Papagos on the roll. The government school there is well conducted.

It will be seen that in the district visited, with the addition of the Papago scholars at San Xavier, not more than 100 in all of these children are in school. The total number of Papago children of school age is probably about 2,000. Their parents will exercise no authority to secure their attendance at school even when they wish them to go, nor, on the other hand, do they hinder them if they desire an education.

PATHOLOGICAL.—The Papagos are very liable to consumption and pneumonia. This arises from the exposure to which they are subject in inclement weather, as all mud roofs leak in protracted rains and a pitch sufficient to carry off the rain would cause the adobe itself to wash off entirely. Many of the tribe are pitted badly with smallpox. Children are subject to measles and whooping cough in addition to lung difficulties. The Papagos have no medical treatment whatever among themselves, and in case of sickness resort to the "medicine man" with his mummeries.

The Indians seem to be able to deal with flesh injuries, but are powerless in cases of disease or fractures of bones. In acute local pain they sometimes put a pinch of cotton on the flesh and burn it there, repeating the process on a new spot at a little distance. Ordinarily their only resource is stoical submission.

SAN CARLOS AGENCY.

Report of Special Agent STEPHEN WHITED on the Indians of the White Mountain Apache reservation, Fort Apache subagency, and the Apache, Mohave, and Papago Indians of the San Carlos agency, Arizona, from August to November, 1890.

Names of Indian tribes or parts of tribes occupying reservations: (a) Aravapai, Chilion, Chirihahwa, Kokotero, Mimbre, Mogollon, Mohavi, Pinal, San Carlos, Sante, Tonto, and Yuma-Apache.

The unallotted area of the White Mountain reservation is 2,838,000 acres, or 3,950 square miles. The outboundaries have been surveyed. It was established, altered, or changed by executive orders November 9, 1871, December 14, 1872, August 5, 1873, July 21, 1874, April 27, 1876, and January 26 and March 31, 1877.

Indian population June 1, 1890: White Mountain Apaches, 2,121; White Mountain reservation, Fort Apache subagency, 1,950; total Apaches, 4,041; Mohave reservation, 881; Yuma reservation, Mohaves, 240; total at agency, 4,922.

The San Carlos agency is situated on a mesa immediately below the junction of the San Carlos with the Gila river. The altitude is about 2,800 feet above sea level. The records of the United States signal service show that the highest temperature for the summer of 1890 reached, July 6, 100°, the lowest for the winter of 1889–1890 was January 20, being 20°. The earliest frost in the fall of 1889 was November 2, and the latest frost in the spring of 1890 was March 16.

The agent reports to the Indian Office that many government buildings at San Carlos are in bad order. They consist of: No. 1, an adobe building 1 story high, 30 by 60 feet, one-half used as agent's dwelling, one-half for storehouse for grain, $1,000; No. 2, a 1-story adobe, built around a court, whole length about 300 feet, used for agent's offices, telegraph office, several rooms for dwelling, storerooms, shops, etc., whole in bad order, needs new roof, $3,000; No. 3, several small adobe buildings in rear of No. 2, used for shops, storerooms, etc., $200; No. 4, an adobe building, 1 story high, 33 by 53 feet, used as a meat shop, $800; No. 5, an adobe building, used for doctor's office and hospital, in bad order, $500; No. 6, a new stone building, 1 story high, 30 by 120 feet, with 4 cross partitions, built for storage, $5,000; No. 7, a stone building, same size as No. 6, now building, for shops; No. 8, a frame steam gristmill, $6,000; No. 9, a frame water gristmill (at Fort Apache), $6,000.

a The statements giving tribes, areas, and bars for agencies are from the Report of the Commissioner of Indian Affairs, 1890, pages 434–443. The population is the result of the census.